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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,033	02/11/2004	Anna Lee Tonkovich	VELOP0115US	2195
56319 7590 09/19/2008 NEIL A. DUCHEZ (VELOCYS) RENNER, OTTO, BOISSELLE & SKLAR, LLP 1621 EUCLID AVENUE 19TH FLOOR CLEVELAND, OH 44115				
EXAMINER WARTALOWICZ, PAUL A				
ART UNIT 1793		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/777,033

Applicant(s)

TONKOVICH ET AL.

Examiner

PAUL A. WARTALOWICZ

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claim 74 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-9, 13-55, 57, 60-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 2004/016346 ('346) in view of Tonkovich et al. (U.S. 6200536).

WO'346 teaches a process for methanol synthesis that is substantially similar to that of the claimed invention (pgs 6,9,10, 12, 14, 18).

WO'346 fails to teach wherein the reaction zones are separated by a non-reactive zone.

Tonkovich et al. teach a microchannel reactor configuration (col. 1) wherein a heat exchanger is disposed between two reactors (fig. 2d, col. 4).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide heat exchangers disposed between two reactors in WO'346 in order to provide an apparatus for substantially similar processes as taught by Tonkovich et al.

Claims 1-73, 75-78 with respect to claims 1-9, 13-55, 57, 60-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al. (WO 03/078052) in view of Van Egmond (U.S. 2004/0127759) and O'Rear (U.S. 6703429) and Brophy et al. (U.S. 7294734) and Tonkovich et al. (U.S. 6200536).

Ward et al. teach a process for methanol synthesis (page 27) wherein the reactions are equilibrated to 90% conversion (page 13) and wherein sequential reactors are used in the process (page 26). It appears that Ward et al. additionally teach or suggest limitations including another reaction temperature in a second step is lower than the reaction temperature in a first step (page 13), the dimensions of the microchannel (page 9), counter-current relationship of fluid of microchannel with heat-exchange channel (page 15).

Ward et al. fail to teach that an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone.

O'Rear et al. teach a process for methanol synthesis wherein an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone (col. 5).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone in Ward et al. because both documents are drawn to the substantially similar method of methanol synthesis as taught by O'Rear et al.

Ward et al. additionally fail to teach the temperature of the process.

Van Egmond teach a process for methanol synthesis [0001] wherein the methanol synthesis reaction temperature is in the range of 150-450°C [0086].

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein the methanol synthesis reaction temperature is in the range of 150-450°C in Ward et al. because both documents are drawn to the substantially similar method of methanol synthesis as taught by Van Egmond.

Ward et al. fail to teach limitations including reaction time and pressure.

Brophy et al. teach a method for methanol synthesis (col. 34) wherein a claimed pressure and contact time are employed.

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a claimed pressure and contact time are

employed in Ward et al. because the two disclosures are drawn to a substantially similar process of methanol synthesis as taught by Brophy et al.

Ward fails to teach the reaction zones are separated by a non-reactive zone.

Tonkovich et al. teach a microchannel reactor configuration (col. 1) wherein a heat exchanger is disposed between two reactors (fig. 2d, col. 4).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide heat exchangers is disposed between two reactors in Ward in order to provide an apparatus for substantially similar processes as taught by Tonkovich et al.

As to claims 75-77, it appears that the prior art teach a substantially similar process as that of the claimed invention such that the properties of the prior art are substantially similar to that of the claimed invention including SLPM and contact time of the reactants.

Claim 74 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al. (WO 03/078052) in view of Van Egmond (U.S. 2004/0127759) and O'Rear (U.S. 6703429) and Brophy et al. (U.S. 7294734) and Tonkovich et al. (U.S. 6200536) and Guillard et al. (U.S. 6887907).

Ward et al. teach a process for methanol synthesis (page 27) wherein the reactions are equilibrated to 90% conversion (page 13) and wherein sequential reactors are used in the process (page 26). It appears that Ward et al. additionally teach or suggest limitations including another reaction temperature in a second step is lower

than the reaction temperature in a first step (page 13), the dimensions of the microchannel (page 9), counter-current relationship of fluid of microchannel with heat-exchange channel (page 15).

Ward et al. fail to teach that an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone.

O'Rear et al. teach a process for methanol synthesis wherein an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone (col. 5).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein an intermediate is formed in a first reaction zone with a first catalyst and a final product is formed in a second reaction zone in Ward et al. because both documents are drawn to the substantially similar method of methanol synthesis as taught by O'Rear et al.

Ward et al. additionally fail to teach the temperature of the process.

Van Egmond teach a process for methanol synthesis [0001] wherein the methanol synthesis reaction temperature is in the range of 150-450 Celsius [0086].

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein the methanol synthesis reaction temperature is in the range of 150-450°C in Ward et al. because both documents are drawn to the substantially similar method of methanol synthesis as taught by Van Egmond.

Ward et al. fail to teach limitations including reaction time and pressure.

Brophy et al. teach a method for methanol synthesis (col. 34) wherein a claimed pressure and contact time are employed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a claimed pressure and contact time are employed in Ward et al. because the two disclosures are drawn to a substantially similar process of methanol synthesis as taught by Brophy et al.

Ward et al. fail to teach a method of making dimethyl ether.

Ward et al. teach a method of carrying out exothermic reactions.

Guillard et al. teach a method of making dimethyl ether (col. 1) in two reactors in heat exchange relationship with each other (col. 2,3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a method of making dimethyl ether in Ward et al. because the process of making dimethyl ether takes place in two reactors in heat exchange relationship with each other as taught by Guillard et al.

Claims 75-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al. (WO 03/078052) in view of Van Egmond (U.S. 2004/0127759) and O'Rear (U.S. 6703429) and Brophy et al. (U.S. 7294734) and Tonkovich et al. (U.S. 6200536) and either one of Tonkovich (U.S. 6969505) or Schmidt et al. (U.S. 6452061)

Ward teach a method as described above.

If Ward fails to teach the limitations of claims 75-77, Tonkovich et al. teach the claimed limitations (col. 13) for the purpose of optimizing an exothermic reaction.

Schmidt et al. teach a method of oxidation of hydrocarbons (col. 1) wherein the claimed SLPM and contact time is known for conversion reactions (col. 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the claimed SLPM and contact time in Ward et al. because these reaction conditions are well known as taught by Tonkovich et al. and Schmidt et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul Wartalowicz/
September 13, 2008

/Steven Bos/
Primary Examiner
A.U. 1793